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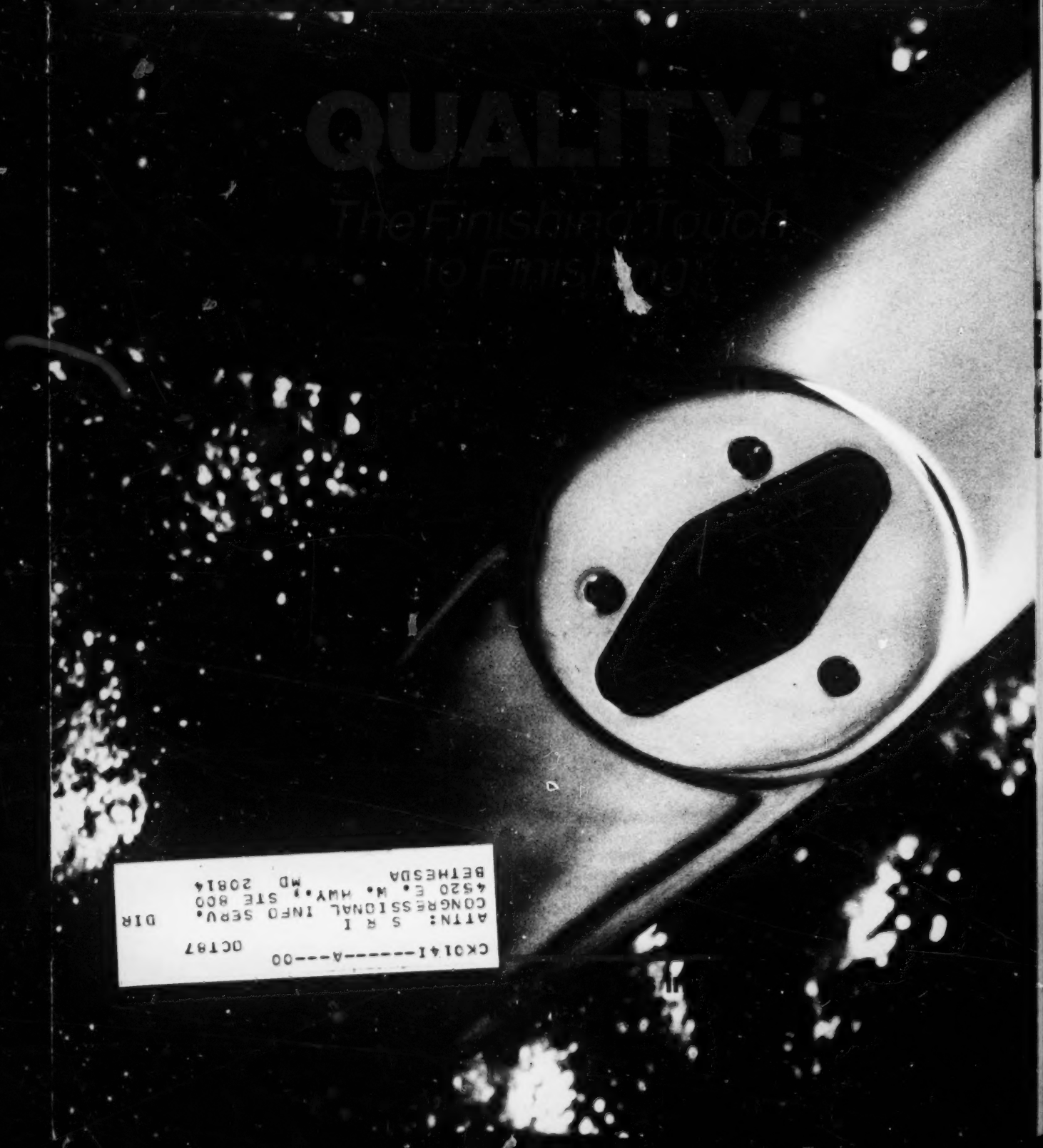
IRON AGE
DECEMBER 5, 1986

MANUFACTURING MANAGEMENT



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IRON AGE
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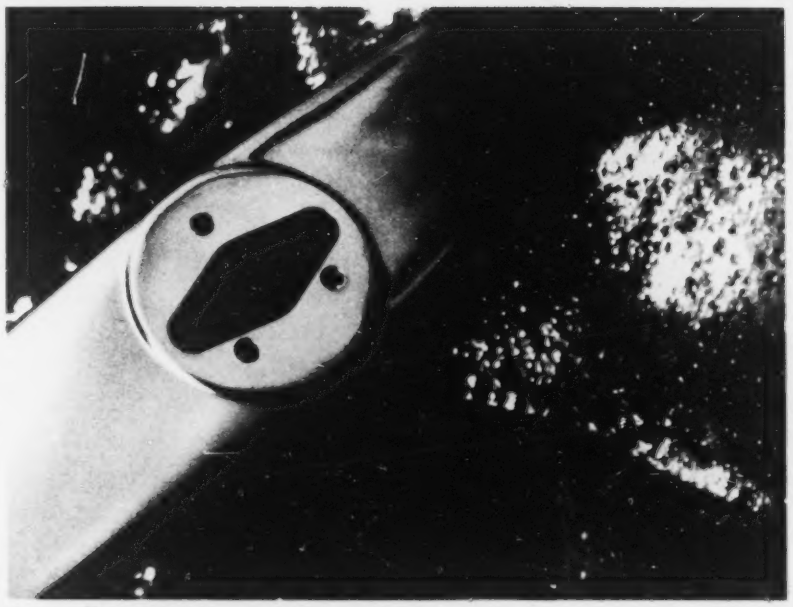

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The material handling system was the place where you could queue up product-in-process. Now products are flowing from operation to operation.

1987: MATERIAL HANDLING'S YEAR

BY ROBERT E. HARVEY

For the Chinese, each year has a special name. This is the Year of the Tiger; next year will be the Year of the Hare. If manufacturers did such things, they likely would designate 1987 as The Year of Material Handling.

Let me explain.

Over the years, as one rising technology after another caught the manufacturer's eye and public spotlight, material handling equipment remained in the background, setting the stage for stars—cutting, bending, fastening equipment and the rest.

But with the recent interest in flexibility, integration, and in just-in-time (JIT) delivery in particular, awareness of material handling is suddenly perking up. Whether this latest interest is sparking short-term excitement or long-term commitment remains to be seem. Some people still need some convincing.

"The people who control the purse strings have not understood the value of material handling in bringing all the parts to the work station together and on time," says Seth R. Schneible, director, marketing services, S.I. Handling Systems Inc., Easton, Pa. "It is seen by them as a necessary evil."

Mr. Schneible believes those who control spending often consider material handling as an afterthought. Appropriations for CNC lathes, the CAD/CAM systems came first. Any leftovers were tossed at the problem of getting products from one place to another.

But for material handling to advance rather than flicker and die, planners must consider material handling earlier than they do.

Automated Guided Vehicles (AGVs) hold a special attraction for companies implementing JIT because of their flexibility.

"Companies are discovering that they can't design the process and then come along and link it with material handling," says Keith Wheeler, vice president, systems engineering, Litton Industrial Automation Systems, Inc. "That is what created those large buffers in the first place that firms are now seeking to reduce.

"We see customers recognizing more and more that material handling design is a key element in their manufacturing strategy. But they need to design material handling in at the beginning, so the system can work as a unit rather than as discrete elements."

Companies that are not looking to improve material handling operations on their own often are being pushed into it by their customers. Companies like GM and Harley-Davidson are demanding that their suppliers move toward JIT and flexible production.

Improved Product Flow

"Companies increasingly are interested in improving product flow," says David W. Clark, vice president, engineering, Jervis B. Webb Co., Farmington Hills, Mich. "Now, as soon as parts arrive at the plant from the outside, they have got to reach the right station in a hurry. The product has got to arrive at the right time to be assembled in the right sequence. Everything has to fall into place, and it takes a material handling system with some computer intelligence behind it to pull this all together."

To make material handling systems more responsive to these

new demands, a lot of interest today lies in "adding a higher degree of intelligence to the conveyor system," says Mr. Clark.

"What is happening is that customers are beginning to focus on error margins, safety stock issues. These are what JIT and other strategies specifically seek to address," notes Mr. Wheeler of Litton. "When initiated, they begin to squeeze the operation internally. They begin to reduce that margin of error. The material handling system was the error buffer years ago. It was the place where you could queue up large amounts of product-in-process."

Not any more. Now with the squeeze on inventory, instead of moving from operation to buffer to operation, parts are moving from operation to operation. All of the strategies that we see happening today, continues Mr. Wheeler, are direct attempts to reduce that error margin and reduce inventory to a more manageable and more cost effective level.

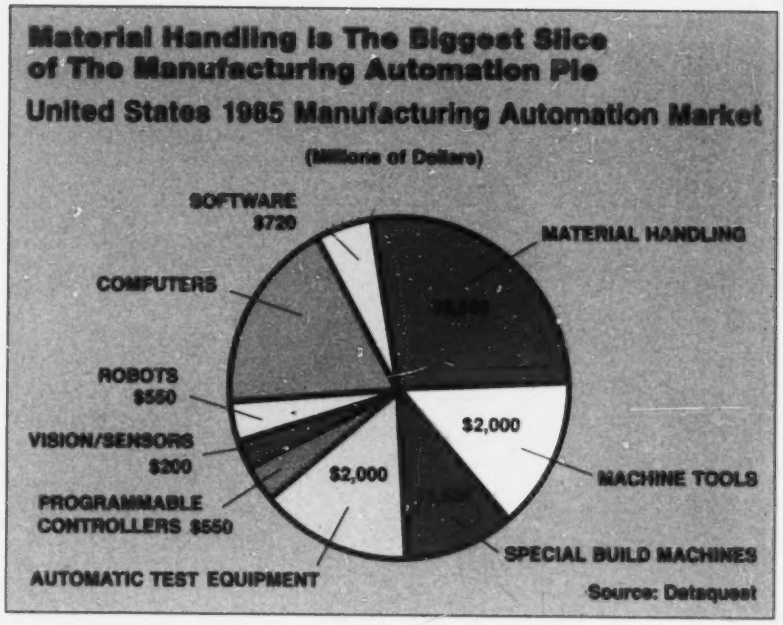
This increased emphasis on JIT, on getting material to just the right place in just the right quantities at just at the right time impacts material handling strategies in a variety of ways:

—First, JIT focuses on plant layout improvement. Its goal is to streamline the flow of materials by concentrating production of one product or one product family in one section of the factory (cellular manufacturing).

—Second, JIT attacks excessive lot sizes. Its object is to turn stop-and-go production facilities into a flow shop. But for a job shop to become a flow shop, it must reduce lot sizes. The smaller the lot sizes get, the easier it is to match daily production with daily demand. Matching supply with demand, however, requires highly flexible, responsive material handling.

—Third, JIT practices stress-reduced inventory levels. According to JIT doctrine, inventory is waste, a cover-up for poor manufacturing practices. But reducing inventory often means making major changes in handling and storage operations.

In particular, JIT aims at improving material flow by reducing material handling and storage operations as much as possible.



Worker Control

Japanese material handling systems are usually of the *pull* rather than the *push* variety. "The Japanese idea is this: don't force work on a worker before he is effectively done with what he is doing," says Mr. Wheeler of Litton. "U.S. companies, at one time users of this system, moved away from it. They tried to increase productivity by using the external environment (regulating the speed of handling systems, for example) to force people to do a specific scope of work within a specific time frame."

U.S. manufacturers are again discovering that manufacturing driven by time standards might be less effective than "a variable solution based on the specific needs of the work and the product. Using this strategy, the Japanese are able to get high quality and flexibility," notes Mr. Wheeler.

New material handling approaches are being developed to address the new handling needs demanded by JIT.

"One that is very popular today is an integrated material management system. It does not have large queues and does not have an in-process build-up of materials, but basically is a request-on-demand system and delivers flexibility throughout the facility," explains Mr. Wheeler. "What you see typically is a materials-management spine down the center of the factory. All the operations are supported by that spine. So material can be moved anywhere in the facility based on the demand of individual workstations."

For all the advantages of JIT, it is not without its dangers. Operating without that safety net of just-in-case inventory demands strict material handling discipline. Firms must be careful not to mount the JIT bandwagon too quickly.

"JIT is growing rapidly in importance," says Ron Ketko, vice president, Cleaver Ketko Gorlitz Papa & Assoc., Birmingham, Mich., a material handling consulting company. "But JIT implementation has to be done very carefully, for every operation is not going to be able to run at 100

pct precision. So, there always has to be, in my opinion, a specific amount of cushion to allow for various hiccups.

"We have seen two schools of thought; one as bad as the other. At one time, companies were so conservative that they maintained one-hour banks of parts between operations and had miles and miles of redundant material handling conveyors. However, now some companies have gone too far the other way."

Back to the Basics

Paralleling this movement toward JIT and increased flexibility is a move back to the basics. Rather than purchasing more capital equipment, a number of firms are trying to make better use of the equipment they already have. Simplification, they are finding, is a prerequisite to automation. And much of that simplification effort is focusing on material handling.

"We encourage people to go to the basics, learn what the problem is and look at the whole gamut of material handling solutions," explains Mr. Clark of Jervis B. Webb. "They shouldn't just opt for fancy systems. We find customers sometimes want to install something much more sophisticated than they really need."

Due to changing manufacturing perceptions, due in part to increased interest in JIT and the desire for increased flexibility, material handling is acquiring new dimensions. It is, for example, being asked to do more.

"A conveyor today can do more than just take items from point A to Point B," says Mr. Clark. "It might tell a workstation or cell what to do with the part it is delivering there, for example. The conveyor, in this case, not only conveys the product but a piece of information right along with it."

Material handling systems are now able to gather, respond to, and pass on information on a variety of subjects such as quality, processing, identification, and measurement to workstations on the line, to plant computers, and to other handling systems.

In a JIT environment their task can be even more demanding. The simplicity of JIT operations and the need to respond immediately to worker demands, rather than a schedule, means that integrating information gathered by a flexible handling system with more-structured production systems, like material requirements planning (MRP) systems, becomes more difficult.

To accommodate its increased work load, controls for material handling systems have improved by leaps and bounds.

Revolutionary Controls

Mr. Schneible offers but one example of how controls are being used. "The handling system first says that is will bring a particular part up to station X. Station X may be a robot, a CNC machine. Upon delivery, the system announces to the station that it is there with the part. The control system at station X then goes to work on the part and announces when processing is finished. Now the master controller gives the handling system directions as to where to take the processed part."

This type of control can be done with a variety of types of hardware. But the hardware that is attracting the most interest is hardware that is flexible enough to be controlled by the worker. Simple systems deliver parts, not on worker demand, but according to a fixed schedule. Power-and-free type equipment is flexible enough for worker control, but automated guided vehicles (AGVs) are more flexible still and are currently receiving a great deal of attention.

AGVs are computer-controlled vehicles which can move throughout the factory, traveling above wires imbedded in the floor. The allure of AGVs, especially for companies implementing JIT, is their extreme flexibility. For example, they can be programmed to pick up material according to a schedule or only when requested to. They can deliver the material just when needed.

"AGVs are promoting a lot of batch assembly," says Mr. Clark. "Instead of car after car on a continuous assembly line in an auto plant, you have one car on an AGV, it goes to a cell where a team of workers performs a variety of operations. When they have completed their operations, and everything is right, they release it to the next station."

"With AGVs, you can control the material handling from the dock to, say, the intermediate storage area or to the line stocking devices," says Ronald Dix, manager of market development and marketing communications, Volvo of America Corp., Automated Systems Div., Sterling Heights, Mich. "And if you are using AGVs in assembly, those can be talking to the line stocking devices. One value of AGVs is the ability to use them throughout the organization: assembly and fabrication, and also material handling."

Some people, however, have reservations about AGVs. Mr. Schneible is aware of at least one installation where a firm is moving from AGVs back to a transport line because AGVs didn't provide the needed throughput.

And there are other potential problems. "No question; there is a need for good knowledge of the vehicles," says Mr. Clark. "They are tricky and a little difficult to install. It takes a good solid plant engineering and maintenance team to really know their intricacies. Nevertheless, they are becoming more reliable and simpler all the time, and we are seeing them increasingly accepted."

Another technology that is improving material handling operations is simulation: the ability to simulate factory operations on a computer screen before actually installing the hardware.

That new technology and the interest in it are why material handling is set for a bright new year! □

PRICE & PRODUCTION DATA

(Effective November 10, 1986)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	135	141	129	171
Pittsburgh	168	177	178	148
Youngstown	107	112	113	97
Lake Erie	102	109	105	122
Detroit	148	148	141	152
Chicago	322	341	305	467
Midwest	156	165	152	155
Southern	141	147	135	184
Western	41	43	41	77
U.S. Production	1,320	1,383	1,299	1,578

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe. Natural delivered lower Lake ports unless otherwise stated. Rail transportation, handling and unloading may be charged to buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural) ..... gross-ton 58.0*
Pellets (per iron unit natural) ..... gross-ton 59.4**
Pellets (per iron unit natural) ..... gross-ton 72.5-86.9***
Mesabi, regular-unscreened ..... gross-ton 32.53
Mesabi, non-bessemer ..... gross-ton 30.03-31.53

*58.0¢—Mineral Services, Inc. as of 8/13/85. **59.4¢—Inland Steel Mining, 1/1/85 and Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports. ***72.5¢—U.S. Steel as of 8/16/85; 86.9¢—Oglebay Norton 3/25/82, Hanna Mining and Cleveland Cliffs, 2/26/82.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective November 10, 1986)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1986	To Date 1985
Net tons, in thousands	1,320	1,383	69,888	74,717
Capability Utilization Rate	54.6	57.2	63.8	65.4

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 8/31/86)	24.951	24.951	24.951	27.582
Pig Iron** (Net ton= 2000 lbs.)	$213.00	$213.00	$213.00	$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	$ 74.17	$ 74.17	$ 73.17	$ 68.83
No. 2 bundles	$ 50.50	$ 50.50	$ 50.50	$ 50.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	$ 78.50	$ 78.50	$ 76.50	$ 69.50
No. 1 steel, Philadelphia	71.50	71.50	71.50	67.50
No. 1 steel, Chicago	72.50	72.50	71.50	69.50
No. 1 bundles, Detroit	75.50	75.50	72.50	56.50
Low Phos., Youngstown	75.50	75.50	72.50	66.50
No. 1 mach'y cast, Pgh	74.50	74.50	74.50	68.50
No. 1 mach'y cast, Phila	93.50	93.50	93.50	91.50
No. 1 mach'y cast, Chi.	101.50	101.50	101.50	97.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strip.
**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.
***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective November 10, 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	51.40	50.75	11/10/86
Copper (C)	62.00	63.00	10/31/86
Lead	27.50	26.75	11/7/86
Magnesium Ingot	153.00	148.00-165.00	12/9/85
Nickel (LME)	169.00	166.00	11/10/86
Zinc	47.00	44.50	10/6/86

ALUMINUM: Avg. for last week & previous week. COPPER (C)=cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	$248.00
Beryllium-copper, per lb. cont. Be	$152.00
Beryllium 97% powder 200	$196.00
Cadmium, ton lots	$1.00
Calcium, ton lots, crown	$3.92
Chromium, 99.5% electro	$4.62
Cobalt, 99%, cathode	$12.50
Gold, per troy oz.	$410.75
Indium, per troy oz.	$2.65
Iridium, per troy oz.	$420.00
Magnesium sticks, 10,000 lbs.	$2.02
Mercury, per 76-lb., f.o.b. N.Y.	$215.00-220.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	$3.45
Palladium, per troy oz.	$128.70
Platinum, per troy oz.	$573.00
Rhodium, per troy oz.	$1,182.00
Silver ingots, per troy oz.	$5.77
Titanium sponge, melt grade	$3.40-3.55
Tungsten powder, hyd. red.	$9.50-9.85
Vanadium	$6.00
Zirconium sponge	$11.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Kuala Lumpur in Malaysian dollars per kilo.)

November 3—265.00 November 6—270.00
November 4—266.00 November 7—267.00
November 5—270.00

Scrap Prices
Brass Mill Scrap

(Cents per lb. over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	56	51
Yellow brass	50	49½
Red brass	51	47
Comm. bronze	52½	47½
Mang. bronze	41½	40½
Free cutting rod ends	49	48

Custom Smelters Scrap

(Cents per lb. carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	48
Light copper	41

Ingot Makers Scrap

(Cents per lb. carload lots, del. refinery)

No. 1 copper wire	49
No. 2 copper wire	40
Light copper	32
No. 1 composition	45
No. 1 comp. turnings	44
Hvy. yellow brass solids	30
Hvy. yellow brass turnings	25
Radiators	34

Aluminum		
New mixed clips	34	— 35
Old sheet	31	— 32
Old cast	31	— 32
Clean dry borings	32	— 33

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum		
Segregated clippings	28	— 29
Mixed I.C. clips	26	— 27
Old sheets and cast	23	— 24
Borings and turnings	19	— 20
Duraluminum clippings	24	— 25

Copper and Brass		
No. 1 copper wire	44	— 47
No. 2 copper wire	35	— 36
Light copper	32	— 33
Radiators	22	— 23
No. 1 composition	36	— 37
No. 1 composition turnings	34	— 35
Cocks and faucets	30	— 31
Clean heavy yellow brass	26	— 28
Brass pipe	26	— 27
New soft brass clippings	39	— 40

Lead		
Heavy soft lead	5	— 7
Whole batteries	1	— 3
Type metal	15	— 17
Electrotype	13	— 14

Nickel		
Nickel solids	105	—115
Nickel rod ends	105	—115
Nickel sheets, clips	105	—115
Nickel turnings	25	— 35

Zinc		
New zinc clippings	16	— 17
Old diecast zinc	12	— 13

(Effective November 10, 1986) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contracts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	$ 78.00 to	$ 79.00
No. 2 hvy. melting	68.00 to	69.00
No. 1 dealer bundles	96.00 to	97.00
No. 1 factory bundles (auto)	98.00 to	99.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	94.00 to	95.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	45.00 to	46.00
Cast iron borings	44.00 to	45.00
Low phos. punchings plate	104.00 to	105.00
Heavy turnings	68.00 to	69.00
No. 1 RR hvy. melting	86.00 to	87.00
Rails, 2 ft and under	94.00 to	95.00
Scrap rails, random lgth	86.00 to	87.00
RR specialties	94.00 to	95.00
No. 1 machinery cast	74.00 to	75.00
Cupola cast	67.00 to	68.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	485.00 to	495.00
18-8 turnings	385.00 to	395.00

Chicago

No. 1 hvy. melting	$ 72.00 to	$ 73.00
No. 2 hvy. melting	68.00 to	69.00
No. 1 dealer bundles	93.00 to	94.00
No. 1 factory bundles (auto)	93.00 to	94.00
No. 2 dealer bundles	57.00 to	58.00
No. 1 busheling	86.00 to	87.00
Shredder scrap	80.00 to	81.00
Machine shop turnings	22.00 to	23.00
Mixed borings and turnings	14.00 to	15.00
Shoveling turnings	23.00 to	24.00
Cast iron borings	39.00 to	40.00
Low phos. forge crop	93.00 to	94.00
Low phos. punchings plate 1/4 in. and heavier	111.00 to	112.00
Low phos. 2 ft and under	106.00 to	107.00
No. 1 RR hvy. melting	76.00 to	77.00
Scrap rails random lgth	79.00 to	80.00
Reroller rails	100.00 to	101.00
Rails, 2 ft and under	94.00 to	95.00
RR couplers and knuckles	79.00 to	80.00
RR car axles	104.00 to	105.00
No. 1 machinery cast	101.00 to	102.00
Cupola cast	89.00 to	90.00
Stove plate	97.00 to	98.00
Steel car wheels	85.00 to	86.00
Stainless		
18-8 bundles and solids	460.00 to	470.00
18-8 turnings	360.00 to	370.00
430 bundles and solids	125.00 to	135.00
430 turnings	85.00 to	95.00

Philadelphia

No. 1 hvy. melting	$ 70.00 to	$ 73.00
No. 2 hvy. melting	62.00 to	65.00
No. 1 dealer bundles	84.00 to	87.00
No. 2 dealer bundles	47.00 to	50.00
No. 1 busheling	84.00 to	87.00
Shredder scrap	82.00 to	85.00
Machine shop turnings	24.00 to	27.00
Mixed borings and turnings	24.00 to	27.00
Shoveling turnings	37.00 to	40.00
Low phos. 5 ft and under	79.00 to	82.00
Low phos. 2 ft punchings	91.00 to	94.00
Electric furnace bundles	93.00 to	96.00
RR specialties	79.00 to	82.00
Rails, 2 ft and under	94.00 to	97.00
Cupola cast	81.00 to	84.00
Heavy breakable cast	52.00 to	55.00
No. 1 machinery cast	92.00 to	95.00

Detroit

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 51.00 to	$ 52.00
No. 2 hvy. melting	50.00 to	51.00
No. 1 dealer bundles	75.00 to	76.00
No. 2 bundles	36.00 to	37.00
No. 1 busheling	73.00 to	74.00
Drop forge flashings	41.00 to	42.00
Machine shop turnings	24.00 to	25.00
Mixed borings and turnings	6.00 to	7.00
Shoveling turnings	24.00 to	25.00
Cast iron borings	21.00 to	22.00
Heavy breakable cast	32.00 to	33.00
Mixed cupola cast	47.00 to	48.00
Automobile cast	71.00 to	72.00
Stainless		
18-8 bundles and solids	450.00 to	460.00
18-8 turnings	310.00 to	320.00
430 bundles and solids	115.00 to	125.00

Youngstown

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 57.00 to	$ 58.00
No. 2 hvy. melting	55.00 to	56.00
No. 1 dealer bundles	77.00 to	78.00
No. 2 dealer bundles	32.00 to	33.00
Machine shop turnings	17.00 to	18.00
Shoveling turnings	17.00 to	18.00
Low phos. plate	75.00 to	76.00
Electric furnace bundles	64.00 to	65.00
Galvanized bundles	61.00 to	62.00

Cleveland

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 56.00 to	$ 57.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 dealer bundles	82.00 to	83.00
No. 1 factory bundles	83.00 to	84.00
No. 2 bundles	30.00 to	31.00
No. 1 busheling	71.00 to	72.00
Machine shop turnings	17.00 to	18.00
Shoveling turnings	17.00 to	18.00
Cast iron borings	20.00 to	21.00
Cut structural & plates 5 ft and under	72.00 to	73.00
Cut structural & plates 2 ft and under	93.00 to	94.00
Low phos. punchings plate	93.00 to	94.00
Foundry steel 2 ft & under	55.00 to	56.00
No. 1 RR hvy. melting	63.00 to	64.00
Rails, 2 ft and under	92.00 to	93.00
Rails, 18 in. and under	94.00 to	95.00
No. 1 machinery cast	83.00 to	84.00
Mixed cast	50.00 to	51.00
Stainless		
18-8 bundles	450.00 to	460.00
18-8 turning	315.00 to	325.00
430 bundles	120.00 to	130.00

Buffalo

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 55.00 to	$ 56.00
No. 2 hvy. melting	45.00 to	46.00
No. 1 busheling	75.00 to	76.00
No. 1 dealer bundles	75.00 to	76.00
No. 2 bundles	32.00 to	33.00
Machine shop turnings	13.00 to	14.00
Mixed borings and turnings	13.00 to	14.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	27.00 to	28.00
Low phos. plate	78.00 to	79.00
Structural and plate 2 ft and under	80.00 to	81.00
Rails, 2 ft and under	79.00 to	80.00
Scrap rails, random lgth	61.00 to	62.00
No. 1 machinery cast	75.00 to	76.00
No. 1 cupola cast	71.00 to	72.00

St. Louis

No. 1 hvy. melting	$ 70.00 to	$ 71.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 busheling	80.00 to	81.00
No. 1 dealer bundles	84.00 to	85.00
No. 2 bundles	55.00 to	56.00
Machine shop turnings	15.00 to	16.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	26.00 to	27.00
No. 1 RR hvy. melting	78.00 to	79.00
Rails, random length	74.00 to	75.00
Rails, 5 ft and under	89.00 to	90.00
RR specialties	77.00 to	78.00
Cupola cast	66.00 to	67.00
Heavy breakable cast	40.00 to	41.00
Stove plate	85.00 to	86.00
Steel car wheels	85.00 to	86.00
Rerolling rails	99.00 to	100.00
Unstripped motor blocks	49.00 to	50.00

Birmingham

No. 1 hvy. melting	$ 73.00 to	$ 74.00
No. 2 hvy. melting	69.00 to	70.00
No. 1 dealer bundles	73.00 to	74.00
No. 2 bundles	49.00 to	50.00
No. 1 busheling	73.00 to	74.00
Shredder scrap	95.00 to	96.00
Machine shop turnings	25.00 to	26.00
Shoveling turnings	36.00 to	37.00
Cast iron borings	36.00 to	37.00
Electric furnace bundles	69.00 to	70.00
Elec. furnace, 3 ft & under	75.00 to	76.00
Structural and plate, 2 ft	90.00 to	91.00
Structural and plate, 4 ft	83.00 to	84.00
No. 1 RR hvy. melting	83.00 to	84.00
Scrap rails, random lgth	73.00 to	74.00
Rails, 2 ft and under	93.00 to	95.00
Angles and splice bars	83.00 to	84.00
No. 1 cupola cast	82.00 to	83.00
Unstripped motor blocks	74.00 to	75.00

Cincinnati

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 54.00 to	$ 55.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	74.00 to	75.00
No. 2 bundles	32.00 to	33.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	12.00 to	13.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	77.00 to	78.00
Rails, random length	59.00 to	60.00
Rails, 2 ft and under	75.00 to	76.00
No. 1 cupola cast	65.00 to	66.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	67.00 to	68.00

New York

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 38.00 to	$ 40.00
No. 2 hvy. melting	31.00 to	32.00
No. 2 dealer bundles	20.00 to	22.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	380.00 to	400.00
18-8 turnings	280.00 to	320.00
430 prepared solids	90.00 to	100.00
430 solids	75.00 to	85.00

Boston

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 49.00 to	$ 51.00
No. 2 hvy. melting	39.00 to	41.00
No. 1 dealer bundles	53.00 to	55.00
No. 2 bundles	32.00 to	34.00
No. 1 busheling	56.00 to	58.00
Shredder scrap	59.00 to	61.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	72.00 to	77.00
Mixed cupola cast	44.00 to	46.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	$ 40.00 to	$ 42.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	31.00 to	33.00
No. 2 dealer bundles	20.00 to	21.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	$ 34.00 to	$ 36.00
No. 2 hvy. melting	28.00 to	30.00
No. 1 dealer bundles	26.00 to	28.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace 1 ft and under (foundry)	67.00 to	69.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	$ 60.00 to	$ 62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 74.00
No. 2 hvy. melting, cut 2 ft and under	66.00
No. 1 dealer bundles	82.00
No. 2 bundles	58.00
Mixed steel scrap	53.00
Bush. new fact. prep'd	77.00
Bush. new fact. unprep'd	60.00
Machine shop turnings	30.00
Short steel turnings	30.00
Mixed borings and turnings	19.00
Cast scrap	97.00

Houston

Brokers buying prices per gross ton on cars

No. 1 hvy. melting	$ 62.00 to	$ 63.00
No. 2 hvy. melting	52.00 to	53.00
No. 2 bundles	33.00 to	34.00
Machine shop turnings	13.00 to	14.00
Crushed turnings	23.00 to	24.00
Shredder scrap	71.00 to	72.00
Cut structural plate, 2 ft and under	88.00 to	89.00
Cut structural plate, 5 ft and under	70.00 to	71.00
Unstripped motor blocks	54.00 to	55.00
Cupola cast	81.00 to	82.00

MIXED SIGNS CLOUD ORDERS OUTLOOK

Orders going to durable goods producers set off some fireworks in September. These orders scored their biggest monthly rise since November 1984; they were up 5 pct to $109 billion.

Reaction to this surge was mixed. Some read 'turnaround' in the September orders jump; others attributed the rise to 'one time factors.'

Those who saw a turnaround taking place claimed that the fallen dollar is finally making life tough in the marketplace for foreigners and easier for U.S. manufacturers.

But some think the September order numbers were influenced by auto sales incentives and the new tax law.

Those who see the tax law giving a one-time shot to orders point to the 8.7 pct jump in nondefense capital goods orders – orders rushed ahead to beat next year's tougher laws on depreciation.

Even if a favorable turnaround in orders is shaping up, it will be some time before it is felt by many durable goods producers. For instance, the $109 billion September orders total was still up only fractionally from the monthly orders total scored back in January.

Orders for transportation equipment accounted for $2.3 billion of the $5.2 billion September increase for all durable goods. This meant that orders for transportation goods were up 8.5 pct to $29 billion. About half of this increase was in orders for aircraft and parts and the other half in orders for motor vehicles and parts.

Orders for electrical machinery were up $1.8 billion, or 11 pct, to $17.7 billion. And in the key nonelectrical machinery category, orders were up $0.2 billion, or 1.3 pct, to $16.8 billion.

Billions of Dollars, Seasonally adjusted Monthly Total, unless otherwise noted Source: U.S. Dept of Commerce		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total	4th Q*	$396.6	$388.9	$397.7
Manufacturing, Total	4th Q*	157.2	148.5	158.6
Manufacturing, Durable Goods	4th Q*	77.0	71.4	75.9
Mining Industry	4th Q*	11.4	12.5	15.4
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	Sept.	109.0	103.8	106.6
Shipments	Sept.	106.1	104.2	103.7
Inventories	Sept.	186.2	186.0	191.9
Unfilled Orders	Sept.	357.7	354.8	356.5
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	Sept.	28.6	26.3	29.2
Capital Goods Producers Defense Industries	Sept.	8.6	8.3	8.1
Primary Metals, Total	Sept.	9.8	10.2	10.2
Steel (SIC 331)	Sept.	4.2	4.5	4.2
Iron & Steel Castings (SIC 332)	Sept.	1.1	1.1	1.3
Nonferrous Metals	Sept.	4.5	4.6	4.7
Nonelectrical Mach.-Equip. Industries, Total	Sept.	16.8	16.6	17.4
Engines & Turbines	Sept.	1.6	0.9	1.2
Farm Mach.& Equipment (Shipments)	Sept.	0.8	0.8	0.8
Construction, Mining & Mat. Hdlg. Equip	Sept.	2.2	2.5	2.8
General Industrial Machinery	Sept.	1.5	1.3	1.5
Metalworking Machinery	Sept.	1.0	0.7	1.0
Machine Tools, Total ($Mill.)**	Sept.	134.8	154.4	174.1
Machine Tools, Metalcutting**	Sept.	100.0	115.1	124.1
Machine Tools, Metalforming**	Sept.	34.8	39.3	50.0
Electrical Mach. & Equip. Industries, Total	Sept.	17.7	16.0	16.9
Elec. Transmission & Ind. Equip.	Sept.	2.2	2.1	2.0
Household Appliances	Sept.	1.7	1.5	1.5
Communication Equipment	Sept.	6.1	5.3	6.8
Transportation Equipment,Total	Sept.	29.0	26.7	28.1
Motor Vehicles & Parts (Shipments)	Sept.	17.8	17.0	17.3
Aircraft, Missiles & Parts	Sept.	9.5	8.5	9.2
Shipbuilding & Military Tanks	Sept.	0.8	0.6	0.9
Fabricated Metal Products, Total	Sept.	14.0	13.7	14.4
Instruments, Total	Sept.	4.8	4.6	4.6

*Est. – Commerce Dept; **Source: NMTBA